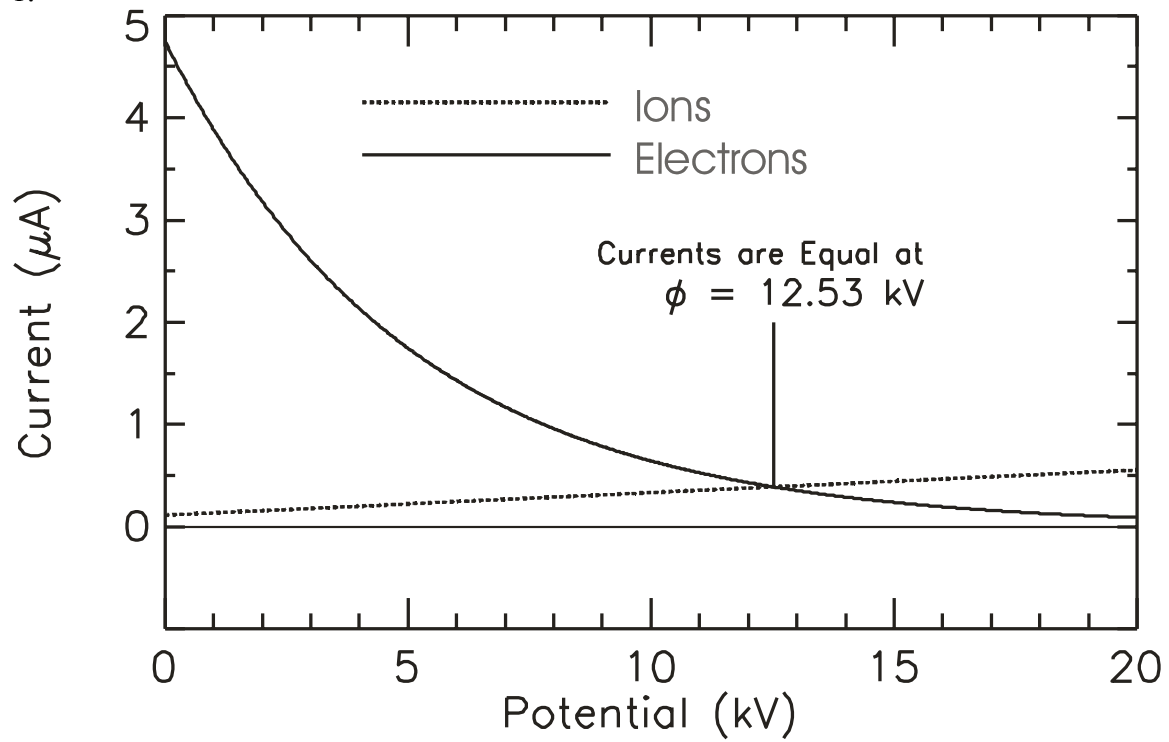1.

6-3. A) If the temperature of human skin is 98.6 F, at what wavelength does the blackbody radiation from skin peak? Which IR window is best for night time surveillance of humans?

From Chapter 1, we have $\quad \lambda_{max} = \dfrac{a}{T}$ where $\quad a = 2.898 \times 10^{-3} \ (m \ K)$.

The conversion from F to K is: $\quad T(C) = \dfrac{5}{9}(T(F) - 32) = 37$

$$T(K) = 37 + 273 = 310$$

$$\lambda = \frac{2.898 \times 10^{-3}}{310} = 9.35 \times 10^{-6} \ m \quad \text{or 9.35 microns}$$

The window from 8-9 microns looks like a good bet.

   B) If the average temperature of the stacks on a surface ship is 750 K, at what wavelength does blackbody radiation from the stacks peak? Which IR window is best for night time surveillance of ships?

$$\lambda = \frac{2.898 \times 10^{-3}}{750} = 3.86 \times 10^{-6} \ m \quad \text{or 3.9 microns.}$$

The window from 3-4 microns looks like it might work.